

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2005/001063

International filing date (day/month/year)
22.03.2005

Priority date (day/month/year)
02.04.2004

International Patent Classification (IPC) or both national classification and IPC
G02B26/02, G09F9/37

Applicant
EASTMAN KODAK COMPANY

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

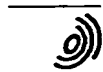
If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



European Patent Office
D-80298 Munich
Tel. +49 89 2399 - 0 Tx: 523656 epmu d
Fax: +49 89 2399 - 4465

Authorized Officer

Casse, M

Telephone No. +49 89 2399-2769



WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/GB2005/001063

15578
AP20 Rec'd PCT/PTO 12 JUL 2006

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/GB2005/001063

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-19
	No: Claims	
Inventive step (IS)	Yes: Claims	1-19
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-19
	No: Claims	

2. Citations and explanations

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/GB2005/001063

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1.) Reference is made to the following documents :

D1 = EP844714

D2 = US4419663

D3 = US4488785

2.1) The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows in figure 1 looked at upside down (the references in parentheses applying to this document):

A display element comprising at least two layers 13,14, a conductive liquid I1 (col. 5 l.1) residing in an upper layer 13,14, the lower layer comprising electrodes 18 and 20 insulated from the liquid with a dielectric coating 24,26, the liquid having a contact angle of more than 90° with the coating of the lower layer (col. 6 lines 41-44), whereby on application of a voltage (col. 7 lines 26 to col. 8 line 11) between the electrodes and the liquid, the liquid moves from the upper layer to the lower layer thereby effecting an optical change in the lower layer.

2.2) The subject-matter of claim 1 differs from this known display element in that:

- the liquid having a contact angle of less than about 60° with the upper layer reservoir 13, however this might be regarded as an implicit property in the absence of any specific coating.
- the optical change is made in the upper layer.
- the two layers are porous.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

2.3) The problem to be solved by the present invention may be regarded as providing an alternative, porous, confining material for an electrowetting display.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) since none of the documents appears to suggest the feature of a porous electrode material made of conductive particles covered by a non-wetting coating:

Porous layers for electrowetting displays are known from D2, disclosing in figure 1 and 4 a display element comprising a single layer of porous material 111, a discrete drop of liquid 160,112, and means 122 for connecting a voltage V_b to the layer, whereby on application of a voltage between the liquid and the porous layer, the drop of moves out of the layer, the drop moving back into the layer on removal of the voltage (col. 6 lines 65 to col.7 line 14), the movement of the liquid effecting an optical change when viewed from above the porous layer (figure 4).

Claim 1 also differs from D2 in that the porous layer is made of conductive particles covered with a low surface energy and electrically insulating coating. At best, this document would suggest with D1 to use a non-wetting porous material but to place the electrode on the outside.

Capillary conductive structures having a liquid absorbing function by electrowetting are also disclosed in D3, figure 1, where either a mesh of wires 400 (col. 3 lines 3-21) is disclosed as electrode. The electrodes 31,32 are here used as a controllable barrier between the first capillary member 400 and a second porous member 10. With zero volt applied to the mesh the system is in an intermediate stage (figure 2a), negative or positive variation of the voltage controlling the flow direction. A small amount of lyophobic material 600 is used on the upper side of mesh. However this is no continuous coating and it solves another problem (col. 4 lines 58-66).

- 3.) Claims 2-19 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.